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March 30, 2015

By ECF

Honorable Sandra L. Townes  
United States District Court  
Eastern District of New York  
225 Cadman Plaza East  
Brooklyn, New York 11201

Re: *United States v. Ahmed*, et al. 12 CR 661 (S2) (SLT)

Dear Judge Townes:

This letter is submitted on behalf of defendant Mohamed Yusuf pursuant to this Court's Order dated March 27, 2015, requiring that, "By March 30, 2015, defendants must produce expert reports for any voice identification experts they anticipate calling at the *Daubert* hearing or at trial," and, at the same time, denying defendant's request "that the government be precluded from calling additional witnesses or conducting additional testing."

Defendant Yusuf provides the following information regarding expert testimony he expects to use "at the *Daubert* hearing or at trial," though he objects that the Court's Order reflects an abuse of discretion, a misreading of the applicable Rules, a violation of due process in that it forces the defendant to disclose his defense to the Government before the Government has established its case<sup>1</sup>, and unfairly limits the defense while offering wide berth to the Government.

In addition, the Court's order is to produce "expert reports" by March 30 or face preclusion of expert testimony. There is no requirement under Rule 16(b)(1)(C), Fed. R. Crim. P., that an expert must prepare a report or that such a report must be disclosed. The Rule requires only that the defendant must disclose "a written *summary* of testimony that the defendant intends to use..." and the *summary* must "describe the witnesses' opinions, the bases and reasons for those opinions and the witnesses' qualifications."<sup>2</sup>

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<sup>1</sup> See *United States v. Mehta*, 236 F. Supp. 2d 150, 156 & n. 3 (D. Mass. 2002); *United States v. Impastato*, 535 F. Supp. 2d 732, 742-3 (ED La. 2008).

<sup>2</sup> In relevant part, 16(b)(1)(C) provides (emphasis added):

The defendant shall, at the government's request, disclose to the government a *written summary* of testimony that the defendant intends to use under Rules 702,

In referring to “expert reports,” the Court (and the Government) may be under the erroneous impression that the defendant’s experts conducted independent voice comparison tests using the materials that were examined by Mr. Lindh. No such tests were conducted by the defense.<sup>3</sup>

At this time (and subject to strategic decisions we cannot make until after the Government presents its evidence and the defendant has the opportunity cross-examine the Government’s witnesses at both the *Daubert* hearing and at trial), Mr. Yusuf intends to elicit testimony from experts Dr. James Wayman and Dr. Geoffrey Stewart Morrison. This evidence is, for the most part, impeachment evidence. It will be offered to discredit the Government’s witness and the Government’s evidence, rather than as affirmative evidence in furtherance of the defendant’s theory of the case.

Both Dr. Wayman and Dr. Morrison have closely read Mr. Lindh’s latest report (dated December 19 and December 21, 2014), and based on their own training, experience, and reference material, each has formed the opinion that Mr. Lindh’s methodology is unsound and his conclusions are untrustworthy. Both Dr. Wayman and Dr. Morrison are expected to opine that Mr. Lindh’s analysis was not based on sufficient facts or data, that he did not use reliable principles and methods, and he did not reliably apply principles and methods to the facts of the case.<sup>4</sup>

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703, or 705 of the Federal Rules of Evidence as evidence at trial: . . . if the defendant requests disclosure under subdivision (a)(1)(G) of this rule and the government complies. . . . *This summary shall describe the witnesses' opinions, the bases and reasons for those opinions, and the witnesses' qualifications.*

<sup>3</sup> The defendant’s position is that an expert’s voice comparison analysis – by whatever currently available method -- is not sufficiently trustworthy for testimony relating to the results to be admitted in evidence under evidentiary Rule 702. Moreover, we do not even know if the telephone recordings and the video used by Lindh in his analyses are identical to the recordings the Government intends to introduce into evidence (or “duplicates” of the recordings that were provided to the defendants in discovery, see Fed. R. Evid. Rule 1001). When asked, AUSA Ariail was unable to confirm whether the recordings provided in discovery are identical to the recordings used by Lindh, and, while he assured that he would provide us with copies of the material Lindh used, he has not done so.

<sup>4</sup> An earlier report by Mr. Lindh (dated April 21, 2011, and identified by the Government as #3500-JL-1 and Exhibit B to ecf # 151) was provided to the defendants in discovery in 2013. However, that 18-page report is entirely in Swedish and was accompanied only by a spare 5-page document in English (entitled “3500-KL-1TR(D)\_Redacted”) that appears to be part translation and part summary of the 18-page document. Defendant notified the Court and the Government that he needed a translation of the report on November 25, 2014, in connection with his motion to preclude the voice identification evidence (see ecf # 133). However, the Government did not provide a translation of the April 2011 report until late in the day on March 25, 2015 (as AUSA Ariail told the Court at the 4 p.m. status conference that day). (In light of defendant’s notice on November 25, 2014, that a full translation of the April 2011 report was needed, we cannot

Attached to this submission are separate documents relating to the qualifications of Dr. Wayman and Dr. Morrison. Below is an elaboration of the expert testimony that defendant expects to elicit and the bases for that testimony.<sup>5</sup>

Dr. James Wayman

Dr. Wayman's opinion that Lindh's analyses and conclusions are unreliable is, as stated above, based not only on his years of training and experience, but also his familiarity with an extensive body of reference material.

As background, several sources provide Dr. Wayman with his understanding of the "phonetic-acoustic" approach to speaker recognition employed by Mr. Lindh (and traditionally followed by members of the IAFPA in Europe), and contribute to Dr. Wayman's assessment that this approach is largely subjective and subject to cognitive and contextual bias: (1) Broeders, A. P. A. "Forensic speech and audio analysis forensic linguistics." *13th INTERPOL Forensic Science Symposium, Lyon, France*. Vol. 26. 2001; and (2) Rose, Phil. *Forensic speaker identification*. CRC Press, 2003; (3) National Research Council. "Strengthening forensic science in the United States: A path forward." (2009); (4) National Commission on Forensic Science, "Presentation of Expert Testimony Policy Recommendations", draft document for public comment, 20 Oct. 2014, [http://www.justice.gov/sites/default/files/pages/attachments/2014/10/20/draft\\_on\\_expert\\_testimony.pdf](http://www.justice.gov/sites/default/files/pages/attachments/2014/10/20/draft_on_expert_testimony.pdf); (5) Kassin, Saul M., Itiel E. Dror, and Jeff Kukucka. "The forensic confirmation bias: Problems, perspectives, and proposed solutions." *Journal of Applied Research in Memory and Cognition* 2.1 (2013): 42-52; (6) Dror, Itiel E., David Charlton, and Ailsa E. Péron. "Contextual

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explain why the Government wrote to the Court on March 20, 2015 – in connection with defendant's motion pursuant to the Protective Order for authorization to disclose the report to a Swedish interpreter for translation (see ecf # 224) -- that it "understood that counsel for Yusuf was satisfied" with the 5-page "translation" it had previously provided. See ecf # 225) In any event, Drs. Wayman and Morrison – who had reviewed the 5-page document that accompanied the April 2011 report -- did not receive the full translation of the April 2011 report until March 26, 2015. Given their other professional commitments (Dr. Wayman is currently in London and Dr. Morrison is currently in Lyons), neither has had the opportunity to thoroughly review the full translation as of the Monday, March 30 deadline for disclosure of "expert reports" set by the Court in its March 27, 2015 Order (filed at 6:00 p.m. last Friday).

<sup>5</sup> Cf. *United States v. Slough*, 2014 U.S. Dist. LEXIS 81581, \* 14-15 (D. D.C. 2014) ("In each of these disclosures, defendants make clear that the opinions of Mr. Patrick, Col. Bolgiano, and Mr. Conrad will be based on their expertise in the field and their examination of discovery. See Mot., Ex. A at 2; Mot., Ex. B. at 3; Mot., Ex. C at 2. The First Circuit has held that this type of disclosure is an adequate basis for an expert's opinion. See *U.S. v. Lipscomb*, 539 F.3d 32, 38 (1st Cir. 2008) (holding that "inform[ing] defense counsel that [police officers] would be testifying on the basis of their 'training and experience'" was adequate under Rule 16). While it is unnecessary to go into exactly what these particular experts will testify to and what their qualifications are, suffice it to say that their opinions and the subjects of their testimony are clear beyond complaint and that their qualifications are manifest in their *curriculum vitae*." )

information renders experts vulnerable to making erroneous identifications” *Forensic science international* 156.1 (2006): 74-78; and (7) Kang, Jerry, et al. “Implicit bias in the courtroom.” *UCLA Law Review* 59.5 (2012).

Dr. Wayman’s opinions also are based on his assessment of Mr. Lindh’s use of likelihood ratios, as well as his understanding of how that concept is commonly used in Europe to express forensic findings and why this approach is not common in the United States. References providing the bases for Dr. Wayman’s anticipated testimony in regard to likelihood ratios are: (1) Bayes, Thomas. “A demonstration of the Second Rule in the Essay towards the Solution of a problem in the Doctrine of Chances, published in the Philosophical Transactions, Vol. LIII. Communicated by the Rev. Mr. Price, in a letter to Mr. John Canton, MAFRS.” *Philosophical Transactions* 54 (1765): 296-325; (2) Rose, Phil. “Technical forensic speaker recognition: Evaluation, types and testing of evidence.” *Computer Speech & Language* 20.2 (2006): 159-191; (3) Gonzalez-Rodriguez, Joaquin, et al. “Robust estimation, interpretation and assessment of likelihood ratios in forensic speaker recognition.” *Computer Speech & Language* 20.2 (2006): 331-355; (4) Tribe, Laurence H. “Trial by mathematics: Precision and ritual in the legal process.” *Harvard Law Review* (1971): 1329-1393.

Several sources contribute to Dr. Wayman’s evaluation of Mr. Lindh’s “Biometric automatic voice analysis” including not only the sources Mr. Lindh cites in his report, but also: (1) Auckenthaler, Roland, Michael Carey, and Harvey Lloyd-Thomas. “Score normalization for text-independent speaker verification systems.” *Digital Signal Processing* 10.1 (2000): 42-54; (2) Greenberg, Craig S., et al. “Human Assisted Speaker Recognition In NIST SRE10.” *Odyssey*. 2010; (3) Brandschain, Linda, et al. “Speaker Recognition: Building the Mixer 4 and 5 Corpora.” *LREC*. 2008; (4) Wu and Wilson, “Nonparametric Analysis of Fingerprint Data”, NISTIR 7226, May 2005, [http://www.itl.nist.gov/iad/894.03/pact/ir\\_7226.pdf](http://www.itl.nist.gov/iad/894.03/pact/ir_7226.pdf) and NISTIR, NFIQ. “7151-Fingerprint Image Quality.” *NIST Interagency Report* (2004).

In addition to pointing out flaws in and incomprehensible aspects of the Lindh reports, Dr. Wayman’s testimony will draw on work he has done over more than twenty years to develop standards for testing and reporting performance in the field of speaker recognition. That work includes his work as Director of the Biometric Test Center at San Jose State University, and with the International Organization for Standards, the National Academy of Sciences (“NAS”)/ National Research Council, the FBI, and the National Institute of Standards and Technology (“NIST”), and the National Commission on Forensic Science (including his role as Vice-Chair of the Organization of Scientific Area Committees’ (“OSAC”) Subcommittee on Forensic Speaker Recognition). From that vantage point, and based on decades of experience in the field and his familiarity with the ongoing efforts of these organizations to enhance and improve speaker recognition technologies and methodologies and to promote best practices, Dr. Wayman will describe the “state of the art” of speaker recognition methodologies, the many factors that affect the ability to recognize a voice, the role that likelihood ratios play in making comparisons between samples and assessing the probabilities that the samples come from the same speakers, the distorting effects of cognitive bias, and the need for both standardized protocols and rigorous testing of any results in order to properly evaluate the reliability and validity of any results.

In this connection, Dr. Wayman will testify concerning: “ISO 17025,” the international standard for laboratory accreditation; the NIST Speaker Evaluation program; the NAS’s publication “Strengthening Forensic Science;” and the Department of Justice/NIST OSAC process. (He is qualified to speak on these topics because of his work for NIST as a “technical assessor” in the accreditation of biometric laboratories, his current position as Vice-Chair of the OSAC forensic speaker recognition subcommittee, his former position as a subcommittee chair of the NAS Panel on Information Technology that does a Congressionally mandated biannual review of the NIST Information Technology laboratory (his subcommittee reviewed the work of the Information Access Division of NIST which performs the biometric testing including Speaker Recognition Evaluations “SRE”), and his work on similar NAS committees doing similar work.) All of this will be the basis for Dr. Wayman’s anticipated testimony that (1) the discipline of forensic voice comparison in general – and in particular the kind of comparison made by Mr. Lindh – is not founded on a sufficiently reliable scientific methodology for findings to be deemed trustworthy evidence in a court of law, and (2) Lindh’s analysis was predominantly subjective and was tainted by cognitive bias, the absence of sound operational procedures, and robust performance standards. In addition, Dr. Wayman will also describe certain NIST rules and regulations to refute representations in the Government’s March 13, 2015 letter (ecf # 222) -- and by Mr. Lindh in his report -- relating to the supposed testing, performance, and widespread acceptance of the biometric speaker recognition software Mr. Lindh used.

In sum, Dr. Wayman will describe widespread skepticism regarding forensic speaker identification in general and subjective forensic analysis techniques in particular. He concludes that the general consensus is, as with all highly subjective techniques, avoid contextual/cognitive/confirmation bias and “proceed with caution.” This conclusion is derived, *inter alia*, from: (1) Broeders, A. P. A. “Forensic speech and audio analysis forensic linguistics.” *13th INTERPOL Forensic Science Symposium, Lyon, France*. Vol. 26. 2001; (2) National Research Council. “Strengthening forensic science in the United States: A path forward.” (2009; (3) Kassin, Saul M., Itiel E. Dror, and Jeff Kukucka. “The forensic confirmation bias: Problems, perspectives, and proposed solutions.” *Journal of Applied Research in Memory and Cognition* 2.1 (2013): 42-52; (4) Dror, Itiel E., David Charlton, and Ailsa E. Péron. “Contextual information renders experts vulnerable to making erroneous identifications.” *Forensic science international* 156.1 (2006): 74-78; (5) Kang, Jerry, et al. “Implicit bias in the courtroom.” *UCLA Law Review* 59.5 (2012); (6) Campbell, Joseph P., et al. “Forensic speaker recognition: A need for caution.” Institute of Electrical and Electronics Engineers, 2009; and (7) Boë, Louis-Jean. “Forensic voice identification in France.” *Speech Communication* 31.2 (2000): 205-224.

#### Dr. Geoffrey Stewart Morrison

We expect that, to provide context for his critique of Mr. Lindh’s report, Dr. Morrison will provide an overview of forensic voice comparison and evaluation of forensic evidence. He will explain key concepts that he will then apply to Mr. Lindh’s report including (1) the likelihood ratio framework; (2) how a likelihood ratio is calculated in a forensic voice comparison; and (3) the meaning and use of a likelihood ratio as evidence. In this connection, he will explain that a key and critical aspect (in both the calculation of the likelihood ratio, as well



as the usefulness of the calculation) is the selection of the relevant population; and he will explain how the validity of the results depends on whether the choice of the relevant population is appropriate and whether and how a sample of the relevant population is used in the analysis.

Dr. Morrison will also explain issues related to “within-speaker” variability and recording conditions, and how a voice comparison system must account for these variables. If, for example, there is mismatch between the recording conditions of (what he calls) the “offender recording” and the recording conditions of (what he calls) the “suspect recording,” and no accounting for this mismatch in making a comparison, actual acoustic differences between the recordings may either be obscured or appear to be more prevalent than actually exist.

Further, Dr. Morrison will explain why testing the performance of a forensic analysis system – including a system based on a human expert’s subjective judgment -- is necessary to evaluate the extent to which the likelihood ratio presented by the forensic scientist can be trusted. He will explain procedures for conducting such testing. Moreover, Dr. Morrison will discuss the need for transparency: if a forensic scientist does not describe the procedures he used to perform his analysis in sufficient detail that other suitably qualified forensic scientists could replicate what the forensic scientist did and determine whether they get similar results, the results obtained by the forensic scientist cannot be trusted.

Dr. Morrison will also testify about non-technical speaker identification, or speaker identification by laypeople (“earwitnesses”). He will explain the listener-specific and speaker-specific factors that contribute to a listener’s identification of a speaker being more or less likely to be correct, including the listener-specific factor of prior expectation. He will also point to a number of studies<sup>6</sup> demonstrating wide discrepancies between lay peoples’ opinions and

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<sup>6</sup> Bull & Clifford (1984), Earwitness voice recognition accuracy. In Wells G.L, & Loftus, E.G. ed., *Eyewitness testimony*, Cambridge (UK): Cambridge University Press, pp. 92-123; Yarmey et al. (2001), Commonsense beliefs and the identification of familiar voices. *Applied Cognitive Psychology*, 15, 283-299. doi:10.1002/acp.702; Bull & Clifford (1999a), Earwitness testimony, *New Law Journal Expert Witness Supplement*, Feb. 12, pp. 216-220; Zetterholm, E. et al (2012) Earwitnesses: The effect of type of vocal differences on correct identification and confidence accuracy. *International Journal of Speech, Language and the Law*, 19, 219-257. 10.1558/ijsl.v19i2.219; Rose P (2002) Naïve auditory identification and discrimination of similar voices of familiar speakers. *Forensic Linguistics*, 2, 1-17; Solan & Tiersma (2003) Hearing voices: speaker identification in court. *Hastings Law Journal*, 54, 373-435; Yarmey AD (2004) Common-sense beliefs, recognition and the identification of familiar and unfamiliar speakers from verbal and non-linguistic vocalizations. *Speech, Language and the Law*, 11, 1350-1771; Ohman L et al (2010) Mobile phone quality vs. direct quality: How the presentation format affects earwitness identification accuracy. *European Journal of Psychology Applied to Legal Context*, 2, 161-182; Sarwar F. et al. (2014) Earwitnesses: The type of voice lineup affects the proportion of correct identifications and the realism in confidence judgements. *International Journal of Speech, Language and the Law*, 21, 139-155. doi:10.1558/ijsl.v21i1.139; Rose & Duncan (1995) Naïve auditory identification and discrimination of similar voices of familiar speakers. *Forensic Linguistics*, 2, 1-17; Nolan et al (2013) Effects of the telephone on perceived voice similarity – Implications for voice line-ups. *International Journal of Speech, Language*

scientific findings about the reliability of voice identification, and concluding that the degree of earwitness certainty should not be taken as an indication of the probability of the correctness of their identification. In one study, for example, a famous phonetician, Peter Ladefoged, failed to correctly identify the voice of his own mother.<sup>7</sup> As with technical speaker recognition, non-technical speaker recognition involves concepts of “similarity” and “typicality;” likewise “recording conditions” and “confirmation bias” are factors that contribute to whether a listener’s identification of a speaker is more or less likely to be correct.

Dr. Hirotaka Nakasone

Finally, Mr. Yusuf also plans to elicit testimony from Dr. Hirotaka Nakasone, Senior Scientist at the FBI’s Voice Recognition Program, at the *Daubert* hearing and, if voice comparison evidence is ruled admissible, at trial. Dr. Nakasone’s expertise, the defendant’s attempts to enlist Dr. Nakasone’s assistance in preparation of the defense, and Dr. Nakasone’s determination not to speak with the defense have been the subject of several previous submissions to the Court. (See ecf ## 166, 177, 185, 197, 204, 211, 211-1, 221, 226) While the Government is in a better position than defense counsel in terms of preparing for Dr. Nakasone’s testimony, and, while we do not believe that Rule 16(b)(1)(C) controls this unusual situation, in an abundance of caution and to avoid any complaint by the Government that it could have been caught by surprise, attached is a letter counsel wrote to Assistant Attorney General Leslie Caldwell on March 27, 2015 (with copies to the EDNY prosecutors), pursuant to 28 CFR 16.21, *et. seq.*, and *United States ex rel. Tuohy v. Ragan*, 340 U.S. 462 (1951), seeking to obtain Dr. Nakasone’s testimony. That letter summarizes the testimony the defendant seeks to elicit.

Respectfully submitted,

\_\_\_\_\_/s/\_\_\_\_\_  
 Jane Simkin Smith  
 David Stern  
 Attorneys For MOHAMED YUSUF

cc: All AUSAs and counsel of record by email

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*and the Law*, 20, 339-46. doi:10.1558/ijsl.v20i2.229; Rathborn et al (1981) Voice recognition over the telephone. *Journal of Psychology Applied to Legal Context*, 2, 161-182; Zhang C. et al. (2013) Effects of telephone transmission on the performance of formant-trajectory based forensic voice comparison – female voices. *Speech Communication*, 55, 796-813. doi:10.1016/j.specom.2013.01.011.

<sup>7</sup> Ladefoged & Ladefoged (1980) The ability of listeners to identify voices. *UCLA Working Papers in Phonetics*, 49, 43-51.

technical speaker recognition involves concepts of “similarity” and “typicality;” likewise “recording conditions” and “confirmation bias” are factors that contribute to whether a listener’s identification of a speaker is more or less likely to be correct.

Dr. Hirotaka Nakasone

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Respectfully submitted,

\_\_\_\_\_/s/\_\_\_\_\_  
Jane Simkin Smith  
David Stern  
Attorneys For MOHAMED YUSUF

cc: All AUSAs and counsel of record by email



## My Professional Bio

March 20, 2015

James L Wayman

I received the Ph.D. degree from the College of Engineering at the University of California, Santa Barbara, in 1980 in the field of computational acoustics and applied mathematics. My first job upon completion was as a Professor of Mathematics at the U.S. Naval Postgraduate School in Monterey, CA, where I taught mathematics to military officers seeking advanced degrees. During my 5 years there, I began developing computer algorithms for speaker recognition and speech processing.

From 1986 to 1995, I worked as a contractor for the U.S. Department of Defense (DoD), developing algorithms for speaker recognition and studying other forms of automated human recognition (called "biometrics" by the DoD). That work resulted in 4 U.S. patents in the area of speaker recognition and speech processing.

In 1995, with funding from the U.S. Department of Transportation and the DoD, I went to San Jose State University (SJSU) and opened the Biometric Test Center to test devices used for automated human recognition, and to develop standards for testing and reporting performance.

In 1997, the Clinton Administration named the SJSU group the "U.S. National Biometric Test Center". I was named as the Director of the Center. We reported to the National Security Advisor through the Security Policy Board. That contractual relationship continued until 2000.

In 2000, SJSU obtained long-term contracts from both the DoD and the British government. The former was to provide a technical advice on face recognition algorithm funding efforts. The latter was to develop standards for testing within the context of the International Organization for Standards (ISO). Both of those contracts continue to the present day, although my DoD contract is no longer through SJSU.

During the first decade of this millennium, I served on three committees of the National Academy of Sciences/National Research Council in areas related to automated human recognition and served as editor of two ISO data format standards (voice and fingerprint). I was named a Fellow of the (British) Institution of Engineering and Technology in 2006 in recognition of this work.

Beginning in 2009, I was personally contracted by the FBI to develop documents and an organizational framework for advancing forensic speaker recognition. Under various FBI funding frameworks, I served as editor of the ANSI/NIST ITL-1 Type 11 record for "Voice Data Format" which was published in 2013, and served as a founding member of the Scientific Working Group (SWG) for Forensic and Investigatory Speaker Recognition. I chaired the SWG subcommittees on "Science in Support of the Law" and "Vocabulary Development". In 2013, the Institute of Electrical and Electronic Engineers (IEEE) advanced me to the grade of Fellow and named me as a "Distinguished Lecturer".

In 2015, the various forensic SWG groups were consolidated by the U.S. Department of Justice and the National Institute of Standards and Technology) into an "Organization of Scientific Area Committees" (OSAC). I now serve as Vice-Chair of the Subcommittee on Forensic Speaker Recognition. SJSU is currently in contractual talks with the FBI to supply funding for that work.

A listing of major publications follows.

### **Books**

J.Wayman, A. Jain, D. Maltoni, D.Maio (eds.) Biometric Systems: Technology, Design and Performance Evaluation (Springer, London, 2005), ISBN 1-85233-596-3, available at <http://bookzz.org/dl/492009/d3e406>

### **33 Peer-Reviewed Journal Publications and Book Chapters (sole authorship unless otherwise noted)**

“Review of Mark. J. Burge and Kevin W. Bowyer, editors. Handbook of Iris Recognition” , *IET Biometrics*, Vol. 3, No. 1, Mar., 2014 pp 41-43

J.L. Wayman, R.McIver, P.Waggett, S. Clarke, M. Mizoguchi, C. Busch, A. Zudenzov ,N.Delvaux, “Vocabulary Harmonization for Biometrics: The Development of ISO/IEC 2382 Part 37” , *IET Biometrics*, Vol, 3, No.1, Mar. 2014 pp 1-8

J.L. Wayman, A. Possolo, and A.J. Mansfield, “A Modern Statistical and Philosophical Framework for Uncertainty Assessment in Biometrics” , *IET Biometrics*, Vol. 2, No. 3, Sept. 2013, pp. 85-96

“The Spirit of IET Biometrics” , *IET Biometrics*, Vol. 1, No.2, July, 2012 pp 91-93, online at <http://digital-library.theiet.org/dbt/dbt.jsp?KEY=IBEIA5&Volume=1&Issue=2>

“Verification/Authentication/Identification/Recognition”, in S.Li (ed.), Encyclopedia of Biometrics, (Springer-Pegasus, 2009)

“The Use of Biometrics with Travel Documents”, in D. Ombelli and F. Knopjes (eds.), Documents: The Developer’s Toolkit (International Organization on Migration, EU, 2008)

“Biometrics in Identity Management Systems” , *IEEE Security and Privacy Magazine*, Special Issue on Identity Management, 6(2), March/April 2008, pp. 30-37

“Biometrics”, in H. Bidgoli (ed.), Handbook of Computer Networks, (J. Wiley and Sons, New York, 2007)

“The Scientific Development of Biometrics Over the Last 40 Years”, in K. deLeeuw and J.A. Bergstra (eds.) The History of Information Security: A comprehensive handbook, (Elsevier, Amsterdam, 2007)

P. Wang, Q. Ji, and J.L. Wayman, "Modeling and Predicting Face Recognition System Performance Based on Analysis of Similarity Scores", *IEEE Trans on Pattern Matching and Machine Intelligence*, Vol. 29, No.4, pp. 665-670, April 2007

R. Cappelli, D. Maio, D. Maltoni, J. Wayman and, A. Jain, "Performance Evaluation of State-of-the-art Fingerprint Verification Systems", *IEEE Trans. Pattern Analysis and Machine Intelligence*, vol. 28, no. 1, pp. 3-18, Jan. 2006.

"Linking Persons to Documents with Biometrics. Biometric systems from the 1970s to date", *Keesing Journal of Documents & Identity*, Issue 16, 2006, pp. 14-19.

"Biometric Authentication", in H. Bidgoli (ed.) Handbook of Information Security, (J. Wiley and Sons, New York, 2005)

J. Wayman, A. Jain, D. Maio, and D. Maltoni, "An Introduction to Biometric Authentication Systems", in Wayman, et al (eds) (2005)

D. Maltoni, D Maio, R. Cappelli, J. Wayman and A. Jain "Technology Evaluation of Fingerprint Verification Algorithms", in Wayman, et al (eds) (2005)

K. Nuger and J. Wayman, "Biometrics and the U.S. Constitution", in Wayman, et al (eds) (2005)

"Biometrics – Now and Then: The development of biometrics over the last 40 years", Biometrics in the Reflection of Requirements: Second BSI Symposium on Biometrics 2004, (SecuMedia, Bonn, 2004)

"Multi-Finger Penetration Rate and ROC Variability for Automatic Fingerprint Identification Systems", in N. Ratha and R. Bolle (eds.), Automatic Fingerprint Recognition Systems (Springer-Verlag, 2003)

"Biometrics", Internet Encyclopedia, H. Bidgoli (editor-in-chief), (J. Wiley and Sons, New York, 2003)

A.J. Mansfield and J. Wayman, "Best Practices of Testing and Reporting Biometric Device Performance: Version 2.01", National Physical Laboratory Report CMSC 14/02, August, 2002, available online at [http://www.npl.co.uk/upload/pdf/biometrics\\_bestprac\\_v2\\_1.pdf](http://www.npl.co.uk/upload/pdf/biometrics_bestprac_v2_1.pdf)

D. Maio, D. Maltoni, R.Cappelli, J. Wayman and A. Jain, "FVC2000: Fingerprint Verification Competition", *Trans. on Pattern Analysis and Machine Intelligence*, 24(3) March. 2002, pg. 402-411

"Fundamentals of Biometric Identification", *International Journal of Imaging and Graphics*, Vol. 1, No. 1, Feb. 2001.

"Biometric Identification Technologies in Election Processes", Federal Election Commission *Advances in Voting* series (2000)

"Federal Biometric Technology Legislation", *IEEE Computer*, Vol. 33, No. 2, February 2000, pg. 76-80

"Biometric Authentication Standards Development", *Move*, American Association of Motor Vehicle Administrators, Vol. 1 No. 3, 2000, pg. 33-34

"Error Rate Equations for the General Biometric System", *IEEE Robotics and Automation*, Vol. 6, No. 1, March 1999, pg. 35-48

"Technical Testing and Evaluation of Biometric Devices", in A. Jain, *et al*, eds. Biometrics: Information Security in a Networked Society, (Kluwer Academic Press, 1999), pg. 345-368

J.M. Libert, T.R. Tsao and J.L. Wayman, "Target Detection Using Image Motion Error Measure", in I. Kadar and V. Libby (eds) Signal Processing, Sensor Fusion, and Target Recognition II, *SPIE Proc.* Vol. 1955, April 1993, pg. 279-285

J. Wayman, C. Munno, J.M. Libert and T.R. Tsao, "Rapid method for target motion detection using the spatiotemporal constraint equation ", in I. Kadar and V. Libby (eds) Signal Processing, Sensor Fusion, and Target Recognition II, *SPIE Proc.* Vol. 1955, April 1993, pg. 324-332

"Optimization of signal distribution networks using simulated annealing", *IEEE Trans. on Communications*, March 1992, pp. 465-471.

J. Wayman and D. Wilson, "Some improvements on the synchronized-overlap-add method of time scale modification for use in real-time speech compression and noise filtering", *IEEE Trans. on ASSP*, January 1988

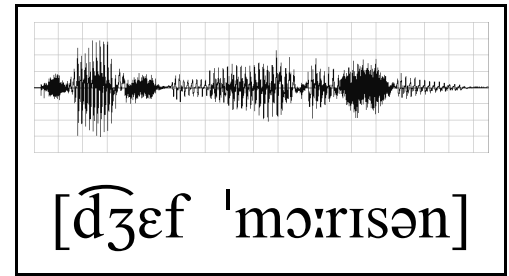
"A study of the straddle Hecht Horizontal bar dismount of the Soviet competitor Nikolai Andrianov", *International Gymnast*, April 1978, (translation from Japanese)

J. Wayman and J. Vanyo, "Computer simulation of reverberation in three-dimensional enclosures", *Journ Acoustical Society of Am*, Vol. 62, No.1, July 1977

# Geoffrey Stewart Morrison

BSc MTS MA PhD

Independent Forensic Consultant



Abridged Curriculum Vitae

updated 29 December 2014

## Contact Information

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<http://forensic-evaluation.net/>

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CANADA

- Canada: +1 604 637 0896

- Australia: +61 2 800 74930

Canadian business number: 82095 0574

## Highlights

- **Adjunct Associate Professor**, Department of Linguistics, University of Alberta. 2010–present
- **Subject Editor**, *Speech Communication*. 2012–2014
- **Director**, Forensic Voice Comparison Laboratory, School of Electrical Engineering and Telecommunications, University of New South Wales. 2010–2013
- **Chair**, Forensic Acoustics Subcommittee, Acoustical Society of America. 2010–2013
- Total research funding brought in, 2010–2013: over \$900k
- Total number of refereed and invited publications: 48
- Total number of forensic cases worked on: 19

## Education

- |       |  |             |
|-------|--|-------------|
| • PhD | Department of Linguistics, University of Alberta       | 2003 – 2006 |
| • MA  | Department of Linguistics, Simon Fraser University     | 2000 – 2002 |
| • MTS | Vancouver School of Theology                           | 1992 – 1995 |
| • BSc | Faculty of Science & Engineering, University of Dundee | 1998 – 1990 |

## Research & Teaching Appointments

- |  |                |
|--|----------------|
| • Adjunct Associate Professor  | 2010 – present |
| Department of Linguistics, University of Alberta, Edmonton, Alberta, Canada  |                |
| • Visiting Fellow  | 2013 – present |
| School of Electrical Engineering and Telecommunications, University of New South Wales   |                |
| • Senior Research Fellow / Director of Forensic Voice Comparison Laboratory  | 2010 – 2013    |
| School of Electrical Engineering and Telecommunications, University of New South Wales, Sydney, New South Wales, Australia                     |                |
| • Visiting Fellow  | 2009 – 2010    |
| School of Electrical Engineering and Telecommunications, University of New South Wales   |                |
| • Invited Lecturer   | 2010 – 2013    |
| Consejo Superior de Investigaciones Científicas (CSIC) [Spanish National Research Council], / Universidad Internacional Menéndez Pelayo (UIMP) |                |
| Judicial Phonetics Specialisation, Masters of Phonetics and Phonology Programme, Madrid, Spain   |                |

- Research Associate 2007 – 2010  
School of Language Studies, Australian National University, Canberra, ACT, Australia
- Research Fellow 2006 – 2007  
Speech Lab, Department of Cognitive & Neural Systems, Boston University, Boston, Massachusetts, USA

## Competitive Research Funding

### Grants

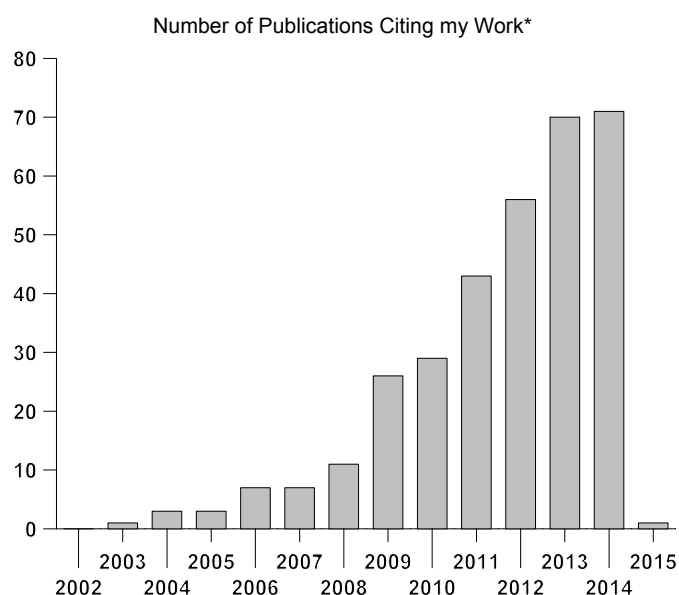
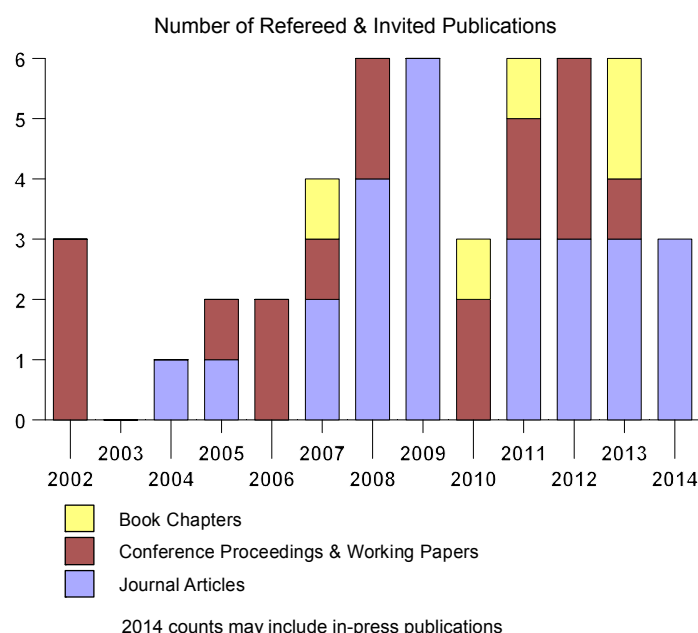
- Australian Research Council Linkage Project AU\$ 544 013 2010–2013  
*Making demonstrably valid and reliable forensic voice comparison a practical everyday reality in Australia*  
Lead Investigator  
with Julien Epps, Eliathamby Ambikairajah, Gary Edmond, Joaquín González-Rodríguez, Daniel Ramos, Cuiling Zhang  
Partner Organisations: Australian Federal Police, National Institute of Forensic Science, Australasian Speech Science and Technology Association, New South Wales Police, Queensland Police Service, Guardia Civil
- United States Government, Office of the Director of National Intelligence (ONDI), US\$confidential 2010–2011  
Intelligence Advanced Research Projects Activity (IARPA), through the Army Research Laboratory (ARL),  
Subcontract through IBM Thomas J. Watson Research Center  
*Incorporation of forensic analysis techniques as part of an automatic speaker recognition system*  
Principal Investigator at IBM: Jason W. Pelecanos  
Other IBM researches: Mohamed Omar, Weizhong Zhu, Sibel Yaman, Kyu Han  
Principal Investigator at UNSW: Geoffrey Stewart Morrison  
Other UNSW researchers:  
Cuiling Zhang, Felipe Ochoa, EwaldENZINGER, Tharmarajah Thiruvaran, William Steed, Eugenia San Segundo Fernández
- Spanish Ministry of Science and Innovation, € 66 000 2010–2013  
National Programme for Fundamental Research Projects  
*Individual voice quality in the identification of speakers*  
with Juana Gil Fernández (Lead Investigator), Secundino Fernández González,  
María José Albalá Hernández, José Antonio Hierro, Jorge Rico Ródenas, Eugenia San Segundo

### Awards

- Australian Research Council Postdoctoral Fellowship (Industry) AU\$ 245 538 awarded 2010
- Social Sciences and Humanities Research Council of Canada Postdoctoral Fellowship CAN\$ 81 000 awarded 2006
- Social Sciences and Humanities Research Council of Canada Doctoral Fellowship CAN\$ 59 000 awarded 2003
- University of Alberta Honorary PhD Scholarship and Walter H Johns Graduate Fellowship CAN\$ 14 566 awarded 2003



## Publication Statistics



\*Excludes publications in which I cite my own work. Publications which cite two or more of my publications are counted only once. There may be additional publications citing my work but not included in these counts. Count for 2014 not complete.

## Selected Publications

- Morrison, G. S., & Stoel, R. D. (2014). Forensic strength of evidence statements should preferably be likelihood ratios calculated using relevant data, quantitative measurements, and statistical models – a response to Lennard (2013) Fingerprint identification: How far have we come? *Australian Journal of Forensic Sciences*, 46, 282–292. doi:10.1080/00450618.2013.833648
- Morrison, G. S. (2014). Distinguishing between forensic science and forensic pseudoscience: Testing of validity and reliability, and approaches to forensic voice comparison. *Science & Justice*, 54, 245–256. doi:10.1016/j.scijus.2013.07.004
- Morrison, G. S., Lindh, J., & Curran, J. M. (2014). Likelihood ratio calculation for a disputed-utterance analysis with limited available data. *Speech Communication*, 58, 81–90. doi:10.1016/j.specom.2013.11.004
- Grigoras, C., Smith, J. M., Morrison, G. S., & Enzinger, E. (2013). Forensic audio analysis – Review: 2010–2013. In: NicDaéid, N. (Ed.), *Proceedings of the 17th International Forensic Science Mangers' Symposium, Lyon* (pp. 612–637). Lyon, France: Interpol.
- Zhang, C., Morrison, G. S., Enzinger, E., & Ochoa, F. (2013). Effects of telephone transmission on the performance of formant-trajectory-based forensic voice comparison – female voices. *Speech Communication*, 55, 796–813. doi:10.1016/j.specom.2013.01.011
- Zhang, C., Morrison, G. S., Ochoa, F., & Enzinger, E. (2013). Reliability of human-supervised formant-trajectory measurement for forensic voice comparison. *Journal of the Acoustical Society of America*, 133, EL54–EL60. doi:10.1121/1.4773223
- Morrison, G. S. (2013). Tutorial on logistic-regression calibration and fusion: Converting a score to a likelihood ratio. *Australian Journal of Forensic Sciences*, 45, 173–197. doi:10.1080/00450618.2012.733025
- Morrison, G. S. (2013). Vowel inherent spectral change in forensic voice comparison. In G. S. Morrison & P. F. Assmann (Eds.) *Vowel inherent spectral change* (ch. 11 / pp. 263–282). Heidelberg, Germany: Springer-Verlag. doi:10.1007/978-3-642-14209-3\_11
- Enzinger, E. & Morrison, G. S. (2012). The importance of using between-session test data in evaluating the performance of forensic-voice-comparison systems. In *Proceedings of the 14th Australasian International Conference on Speech Science and Technology, Sydney* (pp. 137–140). Australasian Speech Science and Technology Association.
- Morrison, G. S., Ochoa, F., & Thiruvanan, T. (2012). Database selection for forensic voice comparison. In *Proceedings of Odyssey 2012: The Language and Speaker Recognition Workshop, Singapore* (pp. 62–77). International Speech Communication Association.
- Enzinger, E., Zhang, C., & Morrison, G. S. (2012). Voice source features for forensic voice comparison – an evaluation of the GLOTTEX® software package. In *Proceedings of Odyssey 2012: The Language and Speaker Recognition Workshop, Singapore* (78–85). International Speech Communication Association. [errata and addenda available on my website]
- Morrison, G. S. (2012). The likelihood-ratio framework and forensic evidence in court: A response to R v T. *International Journal of Evidence and Proof*, 16, 1–29. doi:10.1350/ijep.2012.16.1.390

- Morrison, G. S., Rose, P., & Zhang, C. (2012). Protocol for the collection of databases of recordings for forensic-voice-comparison research and practice. *Australian Journal of Forensic Sciences*, 44, 155–167. doi:10.1080/00450618.2011.630412
- Lindh, J., & Morrison, G. S. (2011). Forensic voice comparison by humans and machine: Forensic voice comparison on a small database of Swedish voice recordings. In W.-S. Lee & E. Zee (Eds.), *Proceedings of the 17th International Congress of Phonetic Sciences, Hong Kong, China* (pp. 1254–1257). Hong Kong: Organizers of ICPhS XVII at the Department of Chinese, Translation and Linguistics, City University of Hong Kong.
- Zhang, C., Morrison, G. S., & Thiruvaran, T. (2011). Forensic voice comparison using Chinese /iau/. In W.-S. Lee & E. Zee (Eds.), *Proceedings of the 17th International Congress of Phonetic Sciences, Hong Kong, China* (pp. 2280–2283). Hong Kong: Organizers of ICPhS XVII at the Department of Chinese, Translation and Linguistics, City University of Hong Kong.
- Morrison, G. S. (2011). Measuring the validity and reliability of forensic likelihood-ratio systems. *Science & Justice*, 51, 91–98. doi:10.1016/j.scijus.2011.03.002
- Morrison, G. S. (2011). A comparison of procedures for the calculation of forensic likelihood ratios from acoustic-phonetic data: Multivariate kernel density (MVKD) versus Gaussian mixture model – universal background model (GMM-UBM). *Speech Communication*, 53, 242–256.
- Morrison, G. S., Zhang, C., Rose, P. (2011). An empirical estimate of the precision of likelihood ratios from a forensic-voice-comparison system. *Forensic Science International*, 208, 59–65. doi:10.1016/j.forsciint.2010.11.001
- Morrison, G. S. (2010). Forensic voice comparison. In I. Freckelton, & H. Selby (Eds.), *Expert Evidence* (Ch. 99). Sydney, Australia: Thomson Reuters.
- Morrison, G. S., Thiruvaran, T., Epps, J. (2010). Estimating the precision of the likelihood-ratio output of a forensic-voice-comparison system. *Proceedings of Odyssey 2010: The Language and Speaker Recognition Workshop*, Brno, Czech Republic (pp. 63–70).
- Morrison, G. S. (2009). Forensic voice comparison and the paradigm shift. *Science & Justice*, 49, 298–308.
- Morrison, G. S. (2009). Comments on Coulthard & Johnson's (2007) portrayal of the likelihood-ratio framework. *Australian Journal of Forensic Sciences*, 41, 155–161.
- Rose, P., & Morrison, G. S. (2009). A response to the UK position statement on forensic speaker comparison. *International Journal of Speech, Language and the Law*, 16, 139–163.
- Morrison, G. S. (2009). Likelihood-ratio forensic voice comparison using parametric representations of the formant trajectories of diphthongs. *Journal of the Acoustical Society of America*, 125, 2387–2397.
- Morrison, G. S., & Kinoshita, Y. (2008). Automatic-type calibration of traditionally derived likelihood ratios: Forensic analysis of Australian English /o/ formant trajectories. *Proceedings of Interspeech 2008 Incorporating SST 2008* (pp. 1501–1504). International Speech Communication Association.
- Zhang, C., Morrison, G. S., & Rose, P. (2008). Forensic speaker recognition in Chinese: A multivariate likelihood ratio discrimination on /i/ and /y/. *Proceedings of Interspeech 2008 Incorporating SST 2008* (pp. 1937–1940). International Speech Communication Association.
- Morrison, G. S. (2008). Forensic voice comparison using likelihood ratios based on polynomial curves fitted to the formant trajectories of Australian English /aɪ/. *International Journal of Speech, Language and the Law*, 15, 249–266.

## Selected Workshops, Tutorials, and Presentations

### Workshops and Talks at Forensic Laboratories

- Morrison, G. S. (2013, May). *Workshop on forensic speech science*. Workshop given at Institut de Recherche Criminelle de la Gendarmerie Nationale, Paris, France.
- Morrison, G. S. (2013, April). *Testing the validity and reliability of likelihood-ratio systems & Calibrating likelihood-ratio systems*. Talk given at the Netherlands Forensic Institute, The Hague, The Netherlands.
- Morrison, G. S. (2013, April). *Introduction to the likelihood-ratio framework for the evaluation of forensic evidence*. Workshop given at Victoria Police Forensic Services Centre, Melbourne, Victoria, Australia.
- Morrison, G. S. (2013, February). *Introduction to the likelihood-ratio framework for the evaluation of forensic evidence*. Workshop given at Queensland Police Forensic Services Branch, Brisbane, Queensland, Australia.
- Morrison, G. S. (2010, April). *Forensic voice comparison and the paradigm shift in forensic science*. Talk given at the Netherlands Forensic Institute, The Hague, The Netherlands.
- Morrison, G. S. (2009, July). *The place of forensic voice comparison in the ongoing paradigm shift*. Talk given at the Forensic and Data Centres, Australian Federal Police, Canberra, ACT, Australia.

Morrison, G. S. (2008, July). *Combining acoustic-phonetic and automatic approaches to forensic speaker comparison: Calibration and fusion of likelihood-ratios extracted from the formant trajectories of diphthongs*. Talk given at Sprecher-Erkennung und Tonträgeranalyse [Department of Speaker Identification and Audio Analysis], Bundeskriminalamt [German Federal Police], Wiesbaden, Germany.

#### **Tutorials and Workshops at Major Conferences**

Morrison, G. S. (2012, August). *An introduction to data-based calculation of likelihood ratios and assessment of validity and reliability*. Workshop presented at the European Academy of Forensic Science (EAFS) Conference, The Hague, The Netherlands.

Morrison, G. S. (2012, June). *Workshop on validity and reliability in forensic voice comparison*. Invited workshop presented at National Center for Media Forensics, University of Colorado Denver immediately prior to the 46th Audio Engineering Society (AES) Conference on Audio Forensics: Recording, Recovery, Analysis, and Interpretation, Denver, Colorado, USA.

Morrison, G. S., & Ramos, D. (2010, November). *Forensic voice comparison*. Tutorial at the 2nd Pan-American/Iberian Meeting on Acoustics / 160th Meeting of the Acoustical Society of America, Cancún, Quintana Roo, Mexico.

Morrison, G. S. (2010, June). *Tutorial on forensic comparison of audio recordings in the same framework as is standard for forensic comparison of DNA profiles*. Tutorial at the 39th International Audio Engineering Society (AES) Conference – Audio Forensics: Practices and Challenges, Hillerød, Denmark.

Kinoshita, Y., Morrison, G. S., & Ramos, D. (2008, September). *Forensic speaker comparison - Likelihood ratios - As not seen on TV*. Tutorial at the Interspeech 2008 Conference, Brisbane, Queensland, Australia.

#### **Key Conference Presentations**

Morrison, G. S., Enzinger, E. (2014, August). *Forensic likelihood ratios should not be based on similarity scores or difference scores*. Paper presented at the 9th International Conference on Forensic Inference and Statistics (ICFIS), Leiden, The Netherlands.

Morrison, G. S. (2013, September). *An introduction to the likelihood-ratio framework for the evaluation of forensic evidence*. Paper presented at the 36th Canadian Identification Society Annual Education Conference, Vancouver, British Columbia, Canada.

Morrison, G. S. (2013, June). *Distinguishing between science and pseudoscience in forensic acoustics*. Paper presented at the 21st International Congress on Acoustics, Montréal, Québec, Canada.

Morrison, G. S., (2012, June). *How does forensic voice comparison differ from automatic speaker recognition? With a particular focus on database selection*. Chinese and Oriental Languages Information Processing Society (COLIPS) Distinguished Lecturer at Nanyang Technological University (NTU) in conjunction with Odyssey 2012: The Language and Speaker Recognition Workshop, Singapore.

Morrison, G. S., & Hoy, M. (2012, June). *What did Bain really say? A preliminary forensic analysis of the disputed utterance based on data, acoustic analysis, statistical models, calculation of likelihood ratios, and testing of validity*. Invited paper presented at the 46th Audio Engineering Society (AES) Conference on Audio Forensics: Recording, Recovery, Analysis, and Interpretation, Denver, Colorado, USA.

Morrison, G. S. (2011, February). *The new paradigm in forensic science*. Invited presentation at the National Judicial College of Australia Expert Evidence Conference, Canberra, Australian Capital Territory, Australia.

Morrison, G. S., (2010, October). *Measuring validity and reliability in forensic science*. Keynote presentation at BIT's 1st Annual World Congress of Forensic Science, Dalian, Liaoning, China.

Morrison, G. S., (2009, July). *The place of forensic voice comparison in the ongoing paradigm shift*. Invited presentation at the 2nd International Conference on Evidence Law and Forensic Science, Beijing, China.

## Forensic Casework

- worked on a total of 19 cases
- written reports submitted in relation to 15 legal cases (8 at the behest of the prosecution/plaintiff and 7 at the behest of the defence/respondent)
- written reports submitted in relation to 1 journalistic case
- contribution to 2 amicus briefs
- oral testimony in court in 4 cases (all at the behest of the defence/respondent)

Defence Council, US State criminal case 2014–2015

- Report submitted, case in progress.

• Canadian Press, Ottawa, ON, Canada 2014

- Critique of a forensic-voice-comparison report produced by another forensic scientist  
<http://forensic-evaluation.net/raynolds/>  
<http://www.nationalnewswatch.com/2014/12/01/duelling-audio-experts-saga-of-secretly-recorded-liberal-candidate-continues/>

• Supreme Court of the United States 2013

- Clacy Watson Herrera v United States, No. 12-1461
- One of 25 scientists and scholars contributing to an Amicus Brief.

• Crime Investigation Unit, Victoria Police, Boroondara, VIC, Australia 2012–2013

- Preliminary report on forensic voice comparison.
- Forensic voice comparison - report on full analysis submitted - suspect changed plea

• Emery Partners Solicitors, Newcastle, NSW, Australia 2012–2013

- Forensic voice comparison - report on full analysis submitted

• Aquila Lawyers, Sydney, NSW, Australia 2012

- R v Christina My Phung Ly
- Report on preliminary analysis of voice recording and critique of a forensic-voice-comparison report produced by another forensic scientist.
- Presentation of oral evidence in court (voir dire and before jury).

• Fisher Dore Lawyers, Brisbane, QLD, Australia 2012

- Peter Foster at Australian Competition and Consumer Commission
- Report on preliminary analysis of voice recording and critique of a forensic-voice-comparison report produced by another forensic scientist.
- Presentation of oral evidence in court.

• Herbert Geer Lawyers, Melbourne, VIC, Australia 2012

- Preliminary report on forensic voice comparison.

• South Australian Office of the Director of Public Prosecutions, Adelaide, SA, Australia, 2012

and Criminal Investigations Branch, South Australia Police, Holden Hill, SA, Australia

- Written critique of a forensic-voice-comparison report produced by another forensic scientist.

• Criminal Investigations Branch, South Australia Police, Port Augusta, SA, Australia 2012

- Preliminary report on forensic voice comparison.

• United States Court of Appeals for the Ninth Circuit 2012

- Nelson Acosta-Roque v Eric Holder Jr, No. 11-70705
- One of 39 scientists and scholars contributing to an Amicus Brief.

• Henry Sklarz Lawyers, Perth, WA, Australia 2011

- State of Western Australia v Thi Dieu Linh Lai [WA Dist Ct, No 654 of 2011]
- Presentation of oral evidence in court on non-technical speaker identification by lay persons.

- Garde-Wilson Lawyers, Melbourne, VIC, Australia 2009
  - Preliminary report on forensic voice comparison.
- D G Price & Co, Barristers & Solicitors, Perth, WA, Australia 2009
  - State of Western Australia v Cameron James Mansell [WA Dist Ct, No 665 of 2008]
  - Written report on non-technical speaker identification by lay persons submitted to court.
  - Presentation of oral evidence in court.
- Purana Taskforce, Victoria Police, Melbourne, VIC, Australia 2009
  - Preliminary report on forensic voice comparison
- South East Asian Crime Squad, New South Wales Police, Sydney, NSW, Australia 2009
  - Preliminary report on forensic voice comparison
- Jim Young, Barrister-at-Law, Sydney, NSW, Australia 2009
  - Written report on non-technical speaker identification by lay persons submitted to court.
- Ford Criminal Lawyers, Sydney, NSW, Australia 2008
  - Preliminary report on forensic voice comparison
- Major Crash Investigation Unit, South Australia Police, Adelaide, SA, Australia 2008
  - Preliminary report on forensic voice comparison

## Other Activities

### Journals

- Speech Communication
  - Subject Editor, including responsibility for papers on forensic speech science 2012 –2014
- Reviewer
  - Science & Justice, Forensic Science International, Australian Journal of Forensic Sciences, Sydney Law Review, Journal of the Acoustical Society of America, Journal of Phonetics

### Conference Organising

- Organiser with Joseph Campbell of special session: *Forensic Voice Comparison and Forensic Acoustics*
  - *Distinguishing between science and pseudoscience in forensic acoustics*
  - 21st International Congress on Acoustics (Montréal, Québec, Canada) June 2013
- Organiser of special session: *Forensic Voice Comparison and Forensic Acoustics*
  - *On the leading edge of the tidal wave of change about to hit forensic science in the US(?)*
  - 162nd Meeting of the Acoustical Society of America (San Diego, California, USA) November 2011
- Organiser of special session: *Forensic Voice Comparison and Forensic Acoustics*
  - 2nd Pan-American/Iberian Meeting on Acoustics (Cancún, Quintana Roo, Mexico) November 2010
- Organiser of special session: *Forensic Speaker Recognition Traditional and Automatic Approaches*
  - Interspeech 2008 (Brisbane, Queensland, Australia) September 2008

### Associations

- Acoustical Society of America,
  - Chair of the Forensic Acoustics Subcommittee 2010 – 2013
- Australasian Speech Science & Technology Association
  - Member of Forensic Speech Science Committee 2010 – 2013
- International Association for Forensic Phonetics and Acoustics
  - Member of Research Committee 2010 – 2012

Jane Simkin Smith  
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March 27, 2015

Ms. Leslie R. Caldwell  
Assistant Attorney General  
Criminal Division  
United States Department of Justice  
Room 2107  
950 Pennsylvania Ave., NW  
Washington, D.C. 20530-0001

Re: United States v. Ahmed et. al (Mohamed Yusuf)  
12 Cr 661(S-2) (SLT)

Dear Assistant Attorney General Caldwell:

David Stern and I are counsel for Mohamed Yusuf in the above-entitled case. Pursuant to 28 CFR 16.21, *et. seq.*, and *United States ex rel. Tuohy v. Ragan*, 340 U.S. 462 (1951), we seek to obtain the testimony of Dr. Hirotaka Nakasone, Senior Scientist at the FBI's Voice Recognition Program, in connection with a *Daubert* hearing scheduled for April 24, 2015. The hearing is being conducted to determine the admissibility of expert testimony proffered by the Government regarding a voice comparison analysis performed by Mr. Jonas Lindh, a Swedish forensic phonetic analyst. If, after the *Daubert* hearing, the Court denies Mr. Yusuf's pending motion to preclude, and allows the Government to introduce the challenged voice comparison evidence, then we would also want Dr. Nakasone to testify at trial which is scheduled to start on May 18, 2015.

The testimony we seek to elicit from Dr. Nakasone is similar to the testimony he gave in June 2013 (in the widely publicized Florida trial of George Zimmerman for the murder of Trayvon Martin, *State of Florida v. Zimmerman*, 12-CF-1083-A (Circuit Court for the 18<sup>th</sup> Judicial District and Seminole County)). In that case, Dr. Nakasone described multiple quality issues with the latest voice recognition technologies and made clear that, because of these issues, the FBI does not permit its technicians to offer opinion testimony in court even if, in the lab, a positive identification is made. As he put it, "We have a long way to go before the system is ready to be rendered as opinions in the court room."

In particular, we would like Dr. Nakasone to explain (as he did in the Zimmerman case) the state of the art of speaker recognition technology, including "phonetic" "aural-perceptual," and "computer algorithm" speaker recognition methodologies (the kinds used in combination by Mr. Lindh), and describe the many factors that negatively affect their performance and reliability



(such as intraspeaker variation, technology induced distortions, compression, poor quality of components of limited capability environmental cofounders, duration and phonetic balance) and a lack of standards. Dr. Nakasone provided a similar description of the FBI's state-of-the-art voice recognition capabilities in *Voice Recognition Capabilities At The FBI*, Institute for Defense and Government Advancement, July 11, 2013 (<http://www.hstoday.us/briefings/correspondents-watch/single-article/voice-recognition-capabilities-at-the-fbi/4d68e94a099c4e46d76ed67efd95aa21.html>).

In addition, we want Dr. Nakasone to explain the work he is doing in connection with the National Institute of Standards and Technology ("NIST")'s Organization of Scientific Area Committees ("OSAC"). Dr. Nakasone is Chair of OSAC's Speaker Recognition Subcommittee. At a recent public meeting sponsored by the American Academy of Forensic Sciences on February 16, 2015, Dr. Nakasone reported that the Speaker Recognition Subcommittee is still years away from establishing "consensus-based standards, guidelines, best practices, and recommendations for forensic and investigatory applications" of speaker recognition technology. (<https://forensicosac.adobeconnect.com/p9016gh8cov/?launcher=false&fcsContent=true&pbMode=normal>)

Finally, we believe that Dr. Nakasone will refute the contention (made by the Government in a letter to the Court dated March 13, 2015, ecf # 222, 11 & n.6) that biometric recognition systems – and in particular, the kind applied by Mr. Lindh -- "are used by numerous law enforcement agencies around the world, including the Federal Bureau of Investigation."

We believe that this demand for Dr. Nakasone's testimony is appropriate and consistent with each of the considerations spelled out in 28 CFR 16.26.

Dr. Nakasone has declined to speak directly with the defense, and we are advised that all inquiries to him must go through the U.S. Attorney's Office.

Please promptly advise whether we should subpoena Dr. Nakasone or whether the Department of Justice will insure his presence at the hearing and at trial.

Sincerely,

Jane Simkin Smith  
David Stern

cc: Loretta E. Lynch, United States Attorney  
AUSA Shreve Ariail  
AUSA Seth DuCharme  
AUSA Richard Tucker  
(via email)